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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/040,173	10/23/2001	Krishnamurthy Vaidyanathan	US 010520	9007

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EXAMINER

KIM, KEVIN

ART UNIT PAPER NUMBER

2611

DATE MAILED: 10/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/040,173

Applicant(s)

VAIDYANATHAN ET AL.

Examiner

Kevin Y. Kim

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9,12-30,33-44,46 and 48-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8,9,12-14,36-42 and 50-52 is/are allowed.
- 6) ☒ Claim(s) 1,15,16,18,20,22-24,26,27, 29, 30, 35,43,44,48 and 49 is/are rejected.
- 7) ☒ Claim(s) 2-7,17,19,21,25,28,33,34 and 46 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The indicated allowability of claims 1 id is withdrawn in view of the newly discovered reference(s) to US patents nos. 6,337,855 and 2003/0026223. Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1,15,16,18,20,22-24,26,27, 29, 30, 35,43,44,48 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malkamäki (US 6,337,855) in view of Eriksson et al (US 2003/0026223).

Claims 1,22-24,26.

Malkamäki discloses a system and method, comprising;

a transmitter producing a modulated data signal (2) that includes an addition of a supplemental signal (training sequence) within a monocarrier channel and

a receiver using the supplemental signal to compute a frequency domain channel estimate (11) for use in equalizing the channel (9) during the demodulation.

The claimed invention differs in that it produces the modulated signal on “a plurality of frequencies.” Erriksson et al teaches frequency hopping in order to spread interference or other factors that degrade the quality of the transmission signal in the same field of endeavor. See paragraph [0011]. Specifically, the frequency changes from one period to

a subsequent period.. The training sequence, used to estimate the channel (see paragraph [0007]) and thus equated to the supplemental signal, is likewise on a plurality of frequencies since it follows the same frequency hopping pattern. Thus, it would have been obvious to one skilled in the art at the time the invention was made to produce a modulated signal on a plurality of frequencies to prevent the degradation of the signal, as taught by Erriksson.

Claims 15, 18, 20

Malkamäki discloses a receiver for improved wireless communications comprising:

an equalizer (9) performing channel equalization on a received signal utilizing a channel estimate; and

a coherent demodulator (11) producing the channel estimate from the received signal and a time-varying signal (training sequence) corresponding to a portion of the received signal.

Malkamäki fails to teach the time-varying signal changes frequency during each of a plurality of periods and the frequency changes from one period to a subsequent period in a predetermined sequence of frequencies.

Erriksson et al teaches frequency hopping in order to spread interference or other factors that degrade the quality of the transmission signal in the same field of endeavor. See paragraph [0011]. Specifically, the frequency changes from one period to a subsequent period. The training sequence, used to estimate the channel (see paragraph

[0007]) and thus equated to the supplemental signal, is likewise on a plurality of frequencies since it follows the same frequency hopping pattern. Thus, it would have been obvious to one skilled in the art at the time the invention was made to produce a modulated signal on a plurality of frequencies to prevent the degradation of the signal, as taught by Erriksson.

Claim 16.

Malkamäki discloses a waveform generator (3). Since the supplemental signal is superposed on the data signal, the duration and the hopping sequence of the supplemental signal are identical to those of the data signal.

Claims 27, 29, 30, 35,43,44,48,49.

Malkamäki additionally teaches an attenuator (4) to attenuate the supplemental signal so that it won't interfere with the data signal.

Allowable Subject Matter

4. Claims 2-7,17,19,21,25,28,33,34 and 46 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. Claims 8,9,12-14,36-42,50-52 are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Y. Kim whose telephone number is 571-272-3039. The examiner can normally be reached on 8AM --5PM M-F.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

September 27, 2006

AU 2611



KEVIN KIM
PRIMARY PATENT EXAMINER